

Structured Query Language



What is SQL

- Is a declarative language used for interacting with data stored in databases
- Contains 3 subparts
 - DDL For defining data structures
 - DML - For manipulating data
 - DCL - For access control
- Most databases have their proprietary extension of SQL

Syntax Rules

- SQL commands are not case sensitive except for items enclosed in ''
- Order of conditions are not important
- Uses ; to separate multiple statements

SQL Glossary

- Record
- Column
- Constraints
 - Nullable
 - Unique
- Index
- Keys
 - Primary
 - Foreign
 - Compound/Candidate
- Table
- Schema
- Database

Comments

- -- (for single line comments)
- /* */ for multi-line comments
- Not supported by all databases



Data Types

- Integer
 - INTEGER (n)
 - INT(n)
 - SMALLINT(n)
 - TINYINT(n)
- Decimal
 - DECIMAL(n, d)
 - NUMERIC(n, d)
- Characters
 - CHAR(n)
 - VARCHAR(n)
- Date
 - DATE(yyyymmdd)

DDL

- Used to define structure (table/columns) within a database
- Supports the following statements
 - CREATE - create an object
 - DROP - delete an object
 - ALTER - modify an object
 - TRUNCATE - empty an object

CREATE

CREATE DATABASE *databaseName*

CREATE TABLE *tableName* ()

CREATE (UNIQUE) INDEX *columnName*
ON *tableName* (*columnName*)

- Creates an object

CREATE (table)

```
CREATE TABLE tableName (  
    columnName1 dataType constraint,  
    columnName2 dataType constraint,  
    PRIMARY KEY (columnName)  
)
```

ALTER

ALTER TABLE *tableName*

ADD *columnName constraint*

ALTER TABLE *tableName*

DROP COLUMN *columnName*

- Modifies the structure of a table by adding or removing columns

DROP

`DROP (DATABASE | TABLE) objectName`

- Deletes an object (table or database) permanently



TRUNCATE

TRUNCATE TABLE *tableName*

- Removes all data from within a table without removing the table.
- Similar to issuing a **DELETE** DML command

DML

- Used to modify contents of define structure (table/columns) within a database
- Supports the following statements
 - INSERT - creates a record
 - SELECT - retrieves 1 or more record
 - UPDATE - updates a crecord
 - DELETE - deletes a record
- All statements DDL and DML (except the SELECT statement) modify the database

Comparison Operators

- =
- IS
- LIKE
 - % - Match 0 or more characters
 - _ - Match exactly 1 character
- IN
- BETWEEN ... AND
- HAVING - Used only with a GROUP BY clause
- EXISTS

Logical Operators

- AND
- OR
- NOT



INSERT

```
INSERT INTO tableName  
(column1, column1, ..., column_n)  
VALUES  
(value1, value2, ..., value_n)
```

- Inserts a record into the database
- The order of values must match the order of the columns

UPDATE

UPDATE *tableName*

SET

column1=value1, column2=value2

..., column_n=value_n

WHERE *condition*

- Updates all the database records where condition evaluates to true

DELETE

```
DELETE FROM tableName  
WHERE condition
```

- Deletes all records where *condition* evaluates to true.

SELECT

- This is the only statement that retrieves data from the database.
- It supports
 - Retrieval of unique records
 - Sorting results
 - Grouping results
 - Function invocation
 - Retrieval from multiple tables

SELECT (simple)

```
SELECT (columnList / * )  
FROM tableName  
WHERE condition
```

- Retrieves all records from the specified table where the condition matches.
- You can retrieve any of the following:
 - ColumnList - comma separated list of columns
 - * - all the columns

SELECT (unique)

```
SELECT DISTINCT (columnList / * )  
FROM tableName  
WHERE condition
```

- Retrieves distinct records where the condition evaluates to true.
- Uniqueness is across every single row retrieved

SELECT (sorting)

```
SELECT columns FROM tableName  
WHERE condition  
ORDER BY column ( ASC | DESC )
```

- Retrieves all records from the specified table where the condition matches.
- You can retrieve any of the following:
 - ColumnList - comma separated list of columns
 - * - all the columns